

1           1. A method for identifying a muscle stem cell, the  
2 method comprising providing a sample comprising a myogenic  
3 cell, and detecting activity of a Bcl-2 promoter within the  
4 myogenic cell as an indication that the myogenic cell is a  
5 muscle stem cell.

1           2. The method of claim 1, wherein the activity of  
2 the Bcl-2 promoter is detected by detecting a Bcl-2 protein  
3 in the myogenic cell.

1           3. The method of claim 2, wherein the Bcl-2 protein  
2 is detected in an immunoassay.

1           4. The method of claim 1, wherein the activity of  
2 the Bcl-2 promoter is detected by detecting Bcl-2 mRNA in  
3 the myogenic cell.

1           5. The method of claim 1, wherein the Bcl-2  
2 promoter is operably linked to a heterologous reporter gene.

1           6. The method of claim 5, wherein the activity of  
2 the Bcl-2 promoter is detected by detecting a polypeptide  
3 encoded by the heterologous reporter gene.

1           7. A method for determining whether a test compound  
2 modulates muscle stem cell differentiation, the method  
3 comprising:

4           (a) providing a myogenic cell identified as a muscle  
5 stem cell;

6           (b) contacting the muscle stem cell with the test  
7 compound; and

1 (c) detecting a change in differentiation of the  
2 muscle stem cell as an indication that the test compound  
3 modulates muscle stem cell differentiation.

1 8. The method of claim 7, wherein the myogenic cell  
2 is identified as a muscle stem cell by detecting activity of  
3 a Bcl-2 promoter in the myogenic cell.

1 9. A method for determining whether a test compound  
2 modulates muscle stem cell proliferation, the method  
3 comprising:

4 (a) providing a myogenic cell identified as a muscle  
5 stem cell;

6 (b) contacting the muscle stem cell with the test  
7 compound; and

8 (c) detecting a change in proliferation of the  
9 muscle stem cell as an indication that the test compound  
10 modulates muscle stem cell proliferation.

1 10. The method of claim 9, wherein the myogenic  
2 cell is identified as a muscle stem cell by detecting  
3 activity of a Bcl-2 promoter in the myogenic cell.

1 11. A method for producing a population of cells  
2 enriched for muscle stem cells relative to a reference  
3 population of cells, the method comprising:

4 providing a reference population of cells comprising  
5 a plurality of muscle stem cells and at least one cell other  
6 than a muscle stem cell;

7 introducing into the reference population of cells a  
8 genetic construct comprising a Bcl-2 promoter operably  
9 linked to a gene encoding a marker protein that is

1 heterologous to wild-type cells of the reference population,  
2 thereby producing a transfected population of cells; and  
3 selecting from the transfected population of cells  
4 those cells that express the marker protein, thereby  
5 producing a population of cells enriched for muscle stem  
6 cells.

1 12. The method of claim 11, wherein the marker  
2 protein is a cell surface polypeptide.

1 13. The method of claim 11, wherein the gene  
2 encoding the marker protein is selected from the group  
3 consisting of CD8, influenza virus hemagglutinin,  $\beta$ -  
4 galactosidase, green fluorescent protein, catechol 2,3-  
5 dioxygenase, and aequorin.

1 14. A method for producing a population of living  
2 cells enriched for muscle stem cells relative to a reference  
3 population of cells, the method comprising:

4 providing a reference population of living cells  
5 comprising a plurality of muscle stem cells that express  
6 Bcl-2 and at least one cell other than a muscle stem cell;  
7 and

8 treating the reference population of cells to induce  
9 apoptosis in cells that do not express Bcl-2, thereby  
10 producing a population of living cells enriched for muscle  
11 stem cells.

1 15. The method of claim 14, wherein the treatment  
2 comprises contacting the reference population of cells with  
3 staurosporine and serum-free medium.

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1           16. A method for expressing an exogenous coding  
2 sequence in a muscle stem cell, the method comprising:  
3           (a) providing a myogenic cell identified as a muscle  
4 stem cell;  
5           (b) introducing into the muscle stem cell a genetic  
6 construct comprising an exogenous coding sequence operably  
7 linked to a muscle stem cell-active promoter, to produce a  
8 transfected muscle stem cell; and  
9           (c) maintaining the transfected muscle stem cell  
10 under conditions permitting expression of the exogenous  
11 coding sequence.

1           17. The method of claim 16, wherein the muscle stem  
2 cell-active promoter is a Bcl-2 promoter.

1           18. The method of claim 16, wherein the cell is  
2 identified as a muscle stem cell by detecting activity of a  
3 Bcl-2 promoter in the cell.

1           19. The method of claim 16, wherein the genetic  
2 construct is introduced into the muscle stem cell *in vitro*.

1           20. The method of claim 16, further comprising  
2 introducing the transfected muscle stem cell into a mammal,  
3 and maintaining the transfected muscle stem cell under  
4 conditions such that the exogenous coding sequence is  
5 expressed in the mammal.